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## Five Early European Winterings in the Atlantic Arctic (1596-1635): A Comparison

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**ABSTRACT.** In the late 16th and early 17th century ten English and Dutch winterings took place in northern regions in less than 100 years. The first wintering occurred in 1553, when the ship of the Englishman Hugh Willoughby became frozen in the Arzina River in northern Russia, and the last in this period took place when seven Dutch volunteers were left behind to winter in Smeerenburg in 1634. Between these two, eight other wintering attempts were undertaken. Some of these were involuntary, while others were voluntary and planned. Five of these winterings are here compared with one another to answer the question why some were successful while others failed. Besides the many practical problems, such as extremes of temperature, primitive housing and illness, the winterers were confronted with psychological problems caused by isolation, overcrowding, boredom and a strange environment, with unknown noises and light phenomena. For the solution of the practical problems ingenuity and creativity were required and both faith and the daily practice of religion were important in tackling psychological problems and keeping diurnal rhythms going. These rhythms turned out to be very important during the polar night. The wintering group that successfully maintained its diurnal rhythm and remained active during the polar night had the best chance of surviving the polar winter.

**Key words:** Willem Barents, whaling, expeditions, Arctic, Novaya Zemlya, Spitsbergen, Jan Mayen

**RÉSUMÉ.** Dans un intervalle de moins de cent ans compris entre la deuxième moitié du XVI<sup>e</sup> siècle et la première moitié du XVII<sup>e</sup> siècle, dix hivernages anglais et danois ont eu lieu dans les régions septentrionales. Le premier date de 1553, quand le navire de l'Anglais Hugh Willoughby se trouva pris dans les glaces de la rivière Arzina, en Russie septentrionale, et le dernier eut lieu en 1634, alors que sept Danois restèrent hiverner à Smeerenburg. Entre ces deux hivernages, il y eut huit autres tentatives. Certaines d'entre elles étaient involontaires, alors que d'autres étaient voulues et planifiées. Dans le présent article, on compare entre eux cinq de ces hivernages pour comprendre pourquoi certains ont réussi tandis que d'autres ont échoué. À côté des nombreux problèmes pratiques comme les extrêmes dans la température, l'hébergement primitif et la maladie, les hivernants étaient confrontés à des problèmes psychologiques causés par l'isolation, la promiscuité, l'ennui et un environnement étrange, peuplé de bruits et de phénomènes lumineux qui leur étaient inconnus. Pour résoudre les problèmes pratiques, ces hommes devaient faire preuve d'ingéniosité et de créativité, et la foi autant que la pratique quotidienne de la religion leur étaient importantes pour faire face aux problèmes psychologiques et conserver un rythme diurne. Ce dernier se révéla d'une extrême importance au cours de la nuit polaire. Le groupe d'hivernants qui parvenait à conserver son rythme diurne et restait actif durant la longue nuit avait de meilleures chances de survivre à l'hiver polaire.

**Mots clés:** Willem Barents, pêche à la baleine, expéditions, Arctique, Novaya Zemlya, Spitsbergen, Jan Mayen

Traduit pour le journal par Nésida Loyer.

### INTRODUCTION

In search of a northern passage to China and during the early days of the Spitsbergen whaling trade (1611-1800) people of the mid-latitudes went to the arctic regions. Normally they only stayed there during the summer, but now and then they were forced to winter and sometimes they wintered voluntarily.

In 1553 the Englishman Hugh Willoughby's ship was frozen in the Arzina River in Russian Lapland (Hakluyt, 1965 [2]:212-223). This wintering turned out to be a disaster: all 70 men died. According to later travellers, they "for lack of knowledge were frozen to death" (Hakluyt, 1965 [3]:197).

The next wintering of West Europeans occurred in 1596-97, when Willem Barents, Jacob van Heemskerck and their crew were blocked by the pack ice in the Kara Sea and forced to winter on the east coast of Novaya Zemlya. Twelve of the 17 men managed to survive the polar winter (De Veer, 1917).

In search of the Northwest Passage, Henry Hudson and his crew wintered at the mouth of the Prince Rupert River in James Bay in 1610-11 (Asher, 1860), Thomas Button and his crew along the Nelson River in 1612-13 (Christy, 1894 [1]) and Jens Munk and his crew by the Churchill River in 1619-20 (Gosch, 1897 [2]). These last three winterings, however, occurred in the boreal regions of Canada in different circumstances from those in the Arctic. The ultimate result was very often the same: many men lost their lives.

In 1630-31 eight Englishmen put ashore for a deer hunting trip were accidentally left behind at Bell Sound, western Spits-

bergen, and survived the polar winter against all odds (White, 1855). In 1633-34 and 1634-35 seven Dutchmen voluntarily stayed in one of the buildings of the whaling settlement Smeerenburg on Amsterdam Island in the northwest corner of the Spitsbergen archipelago (l'Honoré Naber, 1930). The first wintering was a success, but the second failed; all seven men died before the ships returned the following year. In 1633-34 another seven whalers were left behind on Jan Mayen to winter, but this wintering also turned out disastrously and they all died (l'Honoré Naber, 1930).

At the same time, in search of the Northwest Passage, Thomas James wintered in James Bay on Charlton Island with his crew in 1631-32 (Christy, 1894[2]). It was a successful wintering but four of his men never left the island again.

For this paper five arctic winterings — namely, the wintering on Novaya Zemlya, the wintering at Bell Sound, the two winterings in Smeerenburg and the wintering on Jan Mayen — have been selected on geographical grounds. All the overwintering locations selected are situated north of the Arctic Circle, in areas with no trees and no native people (Fig. 1). The original narratives of these selected winterings were studied in order to describe them and to discuss the problem of why some were successful while others failed. The paper focusses on the strategies developed to tackle the typical problems of an arctic wintering, such as extreme temperatures, primitive housing, overcrowding, isolation, boredom and disease.

The information comes from the journals of the winterings, or from summaries if the original journals have not been

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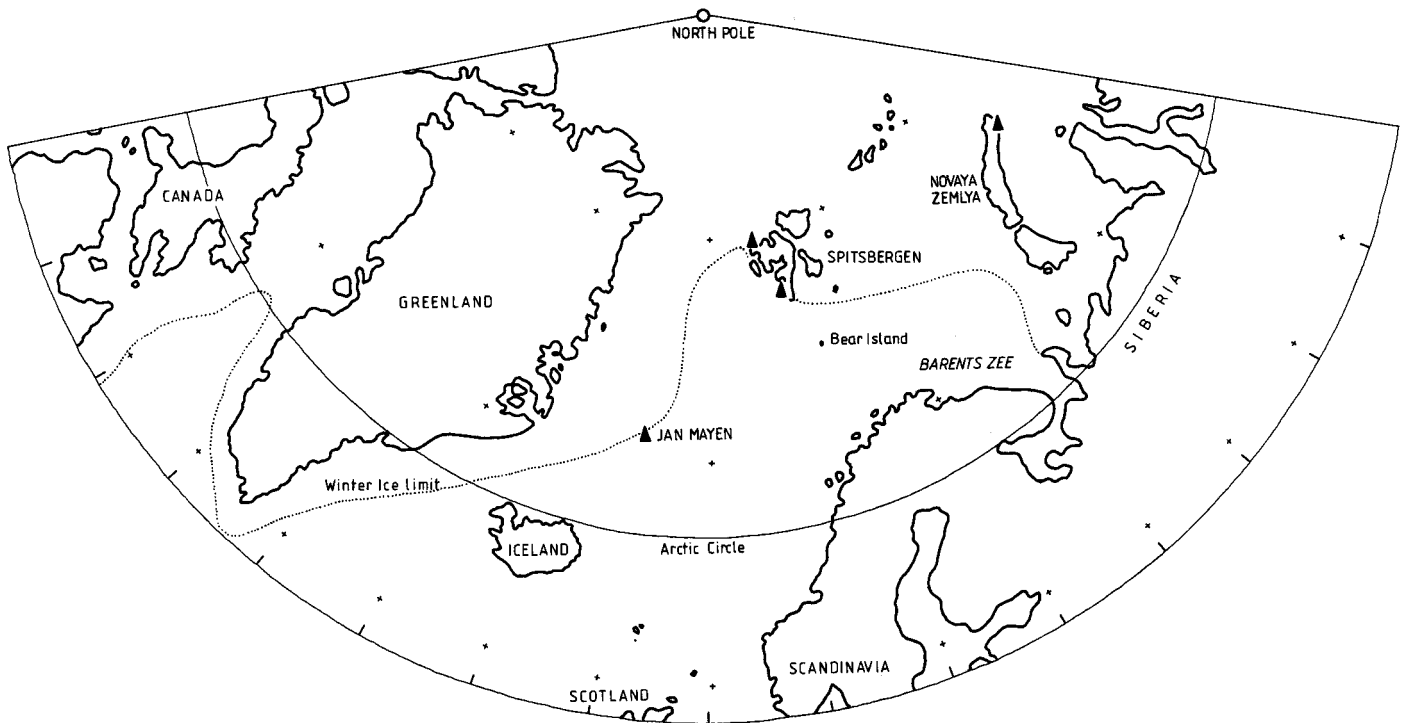


FIG. 1. The locations of the winterings studied. (Drawing H.J. Waterbolk; photo CFD-RUG.)

preserved. These narratives were not all kept in the same fashion. The journals of the wintering on Novaya Zemlya, the first wintering in Smeerenburg and the wintering on Jan Mayen have a daily entry, as was usual in ships' logbooks. From the wintering on Jan Mayen two journals have been preserved, making it possible to check one against the other. The narrative of the wintering in the Bell Sound area is very detailed but does not have daily entries. Only a summary of the original journal of the second wintering in Smeerenburg has been preserved. Although these records differ from one another, they deal with the same subjects in the same way and are therefore comparable. The information from the narratives has been classified to facilitate a comparison of the winterings in a number of respects: environmental conditions, housing, clothing, pastimes, hunting, food and physical and mental health. Some conclusions have been made about the results of these wintering attempts.

#### LIVING CONDITIONS

##### *Environmental Circumstances*

These five West European winterings happened in the regions north of the 10°C isotherm of the warmest month. Four of them even occurred in the area north of the 5°C isotherm of the warmest month, in the so-called High Arctic.

The wintering of Willem Barents and Jacob van Heemskerck on Novaya Zemlya took place in the High Arctic. The winterers found it cold during the entire winter, but especially in December, the beginning of January and the second half of March. Because of low temperatures (the mean temperature in January was -25°C) and snowdrifts they had to stay inside the house for long periods.

Both wintering locations on Spitsbergen, at Bell Sound and Smeerenburg, were also situated in the High Arctic.

Because of the geographical position of Spitsbergen the maritime influence is much stronger here than in Novaya Zemlya, giving rise to more unstable weather, a higher mean temperature in January (-11°C) and sometimes even short periods of thaw in January and February. The frequency of storms in this area is highest in December and January.

Jan Mayen is located in the Low Arctic and has a very strong maritime component to its climate. The mean January temperature (-6°C) is not as low as in Spitsbergen and Novaya Zemlya. The weather is very changeable, with a great deal of precipitation and fog and a high frequency of storms, especially during spring and fall. We are very well informed about the weather on Novaya Zemlya, Smeerenburg and Jan Mayen during the winterings because the Dutch journals start each daily report with weather information. Like ships' logbooks, they give the direction of the wind, wind force, temperature in general terms and precipitation.

Apart from the weather, the hours of daylight also vary considerably in the three areas. On Novaya Zemlya the polar night lasts about 90 days, on Spitsbergen there is no sun for approximately 100-127 days, and the polar night on Jan Mayen lasts for 60 days (24-hour days).

##### *Housing*

Willem Barents and his crew left the ship when it was caught in the ice of the Kara Sea and built a house of driftwood and planks on shore. The house measured 6 × 10 m. The driftwood was used to build the frame and the lower part of the walls, which were constructed of four beams laid in a log cabin construction, as was formerly done by native people in the North. The rest of the walls were closed in with planks from the ship. These planks were fastened to each other and to the frame with nails. There was a fireplace in the middle of the house and five berths were constructed against one of the walls (Fig. 2). The house scarcely

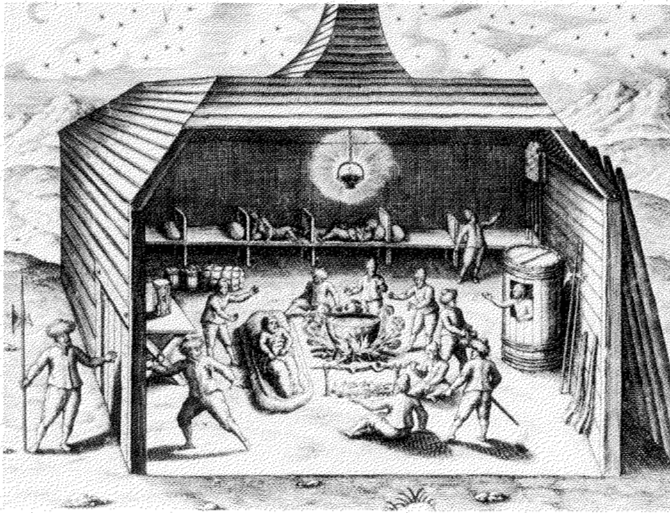


FIG. 2. The interior of the house built by the crew of Willem Barents in 1596. An engraving from J.Th. de Bry and J.I. de Bry: *Drey Schiffahrten der Holländer nach obermeldten Indien durch das mittnächstigsche oder Eismeer . . .* (Published by Mattheus Becker, Frankfurt am Main 1599; photo Knoop, Haren.)

afforded sufficient shelter against the weather. In spite of the heating, ice 5 cm thick frequently formed on the inside of the walls.

The eight Englishmen who were accidentally left behind on Spitsbergen in 1630 "built a warmer room within the great 'tent' at Bell Sound" (Conway, 1904:67). This "tent" had plank walls and a roof covered with tiles (Fig. 3). Inside the building, which measured 24 × 15 m (Muller, 1874:138; White, 1855:269), the winterers built a house 6 × 4.8 m insulated with bricks placed on the inside of the outer wall. The inner walls were double planked and the space between the planks was filled with sand. The ceiling of the small house was covered with five or six layers of planks. Inside this small house four "cabins" were built in which the winterers slept two by two on deerskins to keep each other warm. The fireplace was located in the larger building. This house turned out to be a good shelter; as Pellham, one of the winterers, states in his report (White, 1855:255), no ice formed on the inside of the outer walls.

The Dutch winterings in Smeerenburg took place in one of the already existing buildings of the whaling station with no special precautionary measures taken to prepare it for the winter. The journal of Segersz van der Brugge tells us that this building already had walls of brick on the inside and boards on the outside. The lean-to at the back of the dwelling had only board walls. According to the written sources, the dwelling measured 6.3 × 4.8 m and the storeroom 3.6 × 4.8 m (l'Honoré Naber, 1930:154-156). Archaeological research carried out in 1979-81 has proved that these measurements were correct (Fig. 4) (Hacquebord, 1984:104-128; Hacquebord and Vroom, 1988:53-63). However, this building turned out to be barely sufficient as a shelter against the severe winter. In his journal Segersz van der Brugge complains about it several times and he advises that in the event of another attempt at wintering, people should be lodged in a better-insulated dwelling (l'Honoré Naber, 1930:99). Whether the directors of the Dutch whaling company saw to this, we do not know. The journal of the second wintering in Smeerenburg does not answer this question.

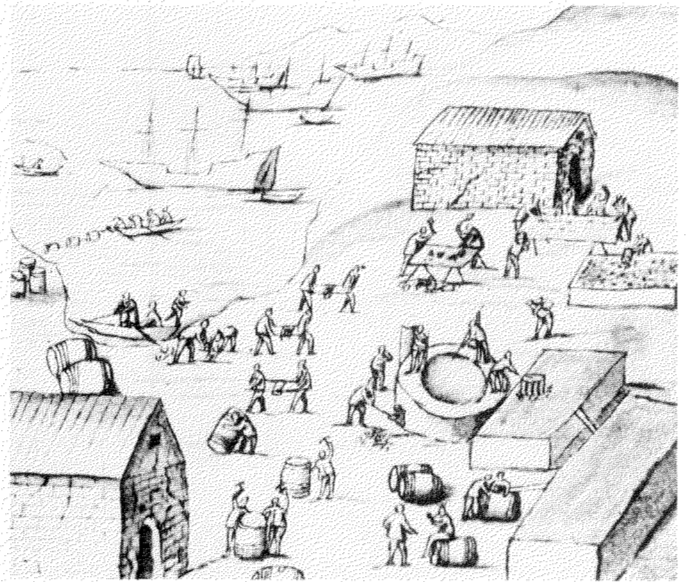


FIG. 3. The English whaling station in Bell Sound. A contemporary drawing to illustrate Mr. Gray's description. (Published in M.W. Conway, *No Man's Land*, Cambridge, 1906, p. 204. Photo CFD-RUG.)



FIG. 4. The excavated remains of one of the buildings in Smeerenburg. (Photo Ben Bekooij.)

The winterers on Jan Mayen probably had the same kind of building as their colleagues in Smeerenburg. The paintings and other iconographical material and the preserved building remains on the site on Jan Mayen point in that direction (Fig. 5) (Hacquebord, 1991).

During all the winterings heating was a great problem. There was an almost continuous shortage of fuel. On Novaya Zemlya driftwood and coal were burned. To stay warm in bed during the coldest days the men placed heated stones and cannonballs in their beds. The English winterers in Bell Sound had no coal. They burned all the wood they could find that they thought the company could manage without in the next season. In Smeerenburg and on Jan Mayen wood, turf and coal were used to heat the houses, but after some weeks there was a shortage of fuel there as well. The winterers tried to solve this in various ways. First they used the coal as economically as possible by riddling the ash. Second, they collected all the wood they could find in the settlement. And finally, they considered demolishing some houses that were not used much, but did not, in fact, do so.





FIG. 5. The wintering location on Jan Mayen. The remains of the buildings of the former Dutch whaling station are shown coming out of the edge of the slope. (Photo Pieter Lagendijk.)

Besides the shortage of fuel, all the winterers had problems with the organization of ventilation in the buildings. Especially during the frequent atmospheric temperature inversions, the ventilation of the buildings was very bad. This becomes clear from the trouble the winterers had with carbon monoxide and smoke (De Veer, 1853:129-130, 1917[1]:88; White, 1855:281; l'Honoré Naber, 1930:151).

### *Clothing*

Direct protection against the cold was far from good. On Novaya Zemlya the winterers simply wore a number of layers of garments. They used cloth from the merchandise on board the ship to make blankets and extra clothes and they used fox furs to make caps (De Veer, 1853:127, 1917[1]:86). They remodelled their felt hats into snowshoes by tying them around their feet on which they wore three or four pairs of stockings (De Veer, 1853:131, 1917[1]:89).

The winterers at Bell Sound did not have such possibilities. After some time their clothes were badly worn and they repaired them with rope-yarn using whalebone needles (White, 1855:274). Use of deerskin clothes is not mentioned in the journal.

Although there is no information about clothing in the journals of the winterers on Spitsbergen and Jan Mayen, we know from excavations at the Smeerenburg site that they wore woollen clothes (Fig. 6). Numerous fragments of these clothes were found in the excavations there. All but one mitten were discovered in the excavated dwellings of the Middelburg try-works of Smeerenburg, the place where the second wintering team lived. The excavations proved that in Smeerenburg felt hats were also used to solve the problem of cold feet (Fig. 7), as insoles made out of felt hats were found in the dwellings of the Middelburg try-works (Fig. 8) (Vons-Comis, 1984:214).

### *Pastimes*

One of the most difficult aspects of the winterings turned out to be how to pass the time. On Novaya Zemlya the winterers were forced to stay inside the house for more than five days on several occasions. There were 16 people in a room of 10 × 6 m. This overcrowding caused irritation and tension. On Novaya Zemlya the winterers faced this stress with strong leadership, discipline and a clear allocation of tasks. Wood

gathering and survey trips to the ship kept their physical and mental condition up to a good standard. They did exercises and played games like "kolf," a kind of curling.

Besides engaging in these activities, the Novaya Zemlya winterers spent much time reading books, especially the Bible, and celebrating Christian feast-days, like Christmas, New Year's Eve, Twelfth Night, Candlemas and Shrove Tuesday. All these days were celebrated with extra food and drink to break the monotony of routine; "and so supposing that we

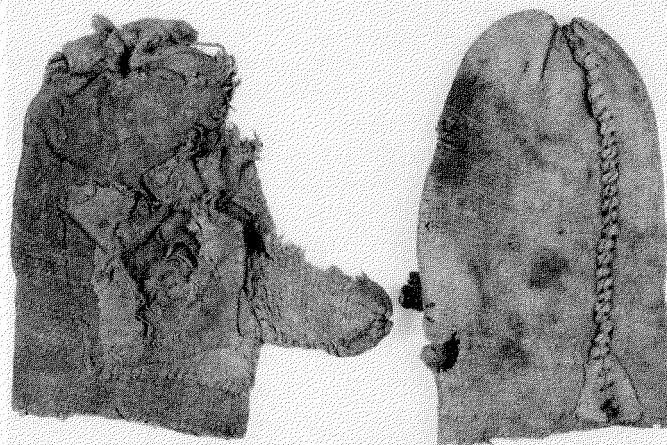


FIG. 6. A pair of mittens excavated in Smeerenburg. (Photo CFD-RUG.)



FIG. 7. A felt hat excavated in Smeerenburg. (Photo CFD-RUG.)



FIG. 8. An insole made out of a felt hat excavated in Smeerenburg. (Photo CFD-RUG.)

were in our owne country and amongst our frends, it comforted vs as well as if we had made a great banket in our owne house" (De Veer, 1853:139).

The journal of the eight Englishmen reports explicitly that the winterers had many pastimes after they had finished preparing for the winter (White, 1855:274). They checked the food and fuel stores and spent many hours roasting the meat of the reindeer they had killed. Besides this they spent a good deal of time discussing their situation and praying to the Lord. Whenever the weather was good enough, they left the house to go hunting. This journal does not tell us anything about the leadership during the wintering. On the other hand, during the first wintering in Smeerenburg there is no doubt about the leadership. It was Jacob Segersz van der Brugge who allocated tasks and maintained discipline. Those who stayed in bed too long forfeited not only their breakfasts, but also their rations of tobacco and brandy (l'Honoré Naber, 1930:96). In this way, Segersz van der Brugge tried to keep a normal diurnal and nocturnal rhythm. This group also did exercises and played games like "kolf." When in January the tension became too great, Segersz van der Brugge lodged three men in one of the houses of another try-works. After three weeks they rejoined the others. Christmas and New Year's Eve were celebrated with extra food and drink, but the other feast-days mentioned in the *Novaya Zemlya* journal were not. These were considered Catholic feast-days and the Reformation had had its effect on Dutch society (Van de Graft and De Haan, 1978:38,56). Their daily prayers and the Sunday rest kept their sojourn structured.

From the journal of the second wintering in Smeerenburg, which took place under the leadership of Andries Jansz van Middelburg, only a summary has been preserved. This summary does not say much about how the winterers passed their time. It reflects a spirit of resignation and fatalism and does not describe anything like the strong, inspired leadership of Segersz van der Brugge.

On Jan Mayen the winterers were bored as soon as the weather prevented them from making trips out of doors. This boredom worsened day by day and is mentioned in both Jan Mayen journals several times. The winterers passed their time reading the Bible and telling each other their life stories. In the journals nothing is said about celebrating Christian feast-days, and no games are mentioned. There is no mention of their leader Outger Jacobsz trying to stimulate them to celebrate these days. One of the winterers used his time to learn to read and write.

Besides all the activities described here, hunting constituted the most important pastime for all wintering parties.

### *Hunting*

On *Novaya Zemlya* the winterers hunted for polar bears and arctic foxes. The bears were skinned and the grease was melted to be used as fuel in oil lamps. Altogether they killed 14 polar bears, the meat and furs of which they did not use in every case. The furs of the arctic foxes, however, were used for caps, and their meat was found to be tasty. The winterers trapped 26 foxes, using traps made in the same style as those used on Spitsbergen until recently. On their way home they also killed birds and gathered eggs on the west coast of *Novaya Zemlya*.

Once the English sailors had become accustomed to the idea of wintering on Spitsbergen, they started to hunt for

reindeer. In August two hunting trips resulted in the killing of 19 reindeer and 4 polar bears. In September they also killed 3 walruses. Together with the remains of the previous season's whales, this was their entire winter food supply. In February and March, when the sun had returned, they killed 7 bears and 50 foxes. These foxes were caught in traps baited with dead young guillemots that the winterers found in the snow under the steep bird cliffs. These birds had died during their first attempt to fly in the previous summer.

With a bearskin, which was laid on the ground with the flesh side up and set with springs made from baleen, they caught 60 Ivory Gulls in March and later, in May, they gathered eggs, probably goose eggs (White, 1855:280).

The first winterers of Smeerenburg started with a trip to the so-called Reindeerplain to hunt for reindeer. They managed to kill and butcher three reindeer and bring them to Smeerenburg. There they washed the quarters with vinegar, peppered them and hung them outside the houses to freeze (l'Honoré Naber, 1930:87). Later in the winter they hunted for polar bears, arctic foxes and walruses. Most of the time the bears were hit with muskets and killed by lances (Fig. 9). The meat was used only to attract foxes, which were shot or caught in snares. The fox furs were used for making caps and the fox meat was eaten. Whenever possible the winterers sailed out to hunt for whales, but they could not get even one. The tongue of the only walrus they killed was cooked and eaten, and it was very tasty. Besides the animals mentioned here, in the springtime they successfully hunted for Little Auks, Glaucous Gulls and Black Guillemots as well.

The winterers of the second wintering in Smeerenburg hunted for bears and foxes several times, but they were not very successful. They killed only one arctic fox.

There probably were no foxes on Jan Mayen in the year of the wintering, because these animals are not mentioned in the journals. The winterers hunted for polar bears but were only occasionally successful. The bears they killed were skinned and butchered. A part of the meat was salted and the rest was cooked. Besides hunting for bears, they unsuccessfully tried to kill two whales that were lying on the beach one day.

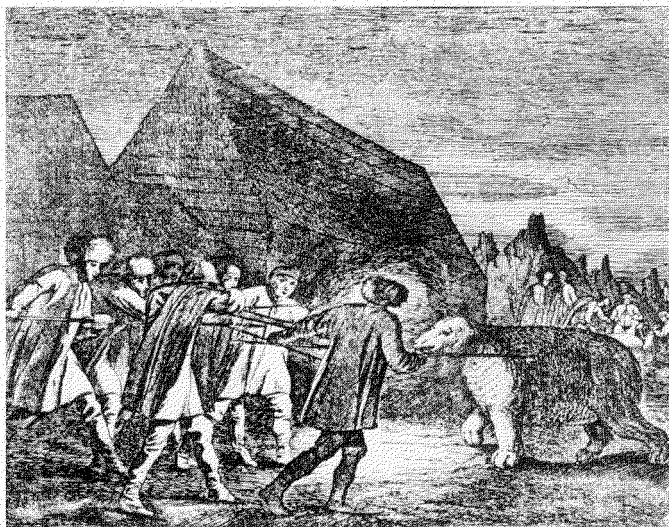


FIG. 9. Hunting for polar bears in the middle of the dark polar winter; an engraving from the wintering journal of Segersz van der Brugge. (Photo CFD-RUG.)

## Food

Obviously food played an important role in the outcome of the wintering. During the voluntary winterings at Smeerenburg and on Jan Mayen and the involuntary wintering on Novaya Zemlya the winterers had the normal ship's stores at their disposal. This food was suited to long-term storage and therefore did not contain sufficient vitamins. The basic food consisted of beans, peas, groats, bread and ship's biscuit. Salted meat, bacon, stockfish (dried cod), butter, cheese, wine, beer and brandy were also taken along (Conway, 1904:166-167). Beer, their normal drink, froze very fast and sprang leaks in the casks. Thus the winterers lost a great deal of beer and there was soon a shortage of drink. To solve this problem they melted snow. Wine and brandy were used as refreshments. The yield of the hunt was very welcome as a supplement to the diet. Reindeer, arctic foxes, polar bears and birds provided variety, and the fresh meat was discovered to prevent scurvy.

During Barents's voyage polar bear meat was tried — "wee eate some of her flesh; but wee brookt it not well" (De Veer, 1853:76) — but the men did not like the taste and it was not eaten again. Later that voyage they ate the liver, which tasted good, but they became sick from vitamin A toxicity.

The English winterers did not have any aversion to polar bear meat and for 20 days they lived on this meat alone, stating: "And upon this Beare we fed some twenty dayes, for shée was very good flesh and better than our Venison." However, eating the liver affected them too: "This onely mischance wee had with her, that upon the eating of her liver our very skinnes peeled off" (White, 1855:279).

The Smeerenburg winterers had such a strong aversion to bear meat that they even disliked foxes that fed on bear carcasses (l'Honoré Naber, 1930:136). Martens, a German barber-surgeon, gives an explanation of this behaviour in his book: "for the seamen are of opinion that if they eat of it [the polar bear meat], it makes their hair grey [prematurely]" (Martens, 1675:74; White, 1855:81).

The Jan Mayen winterers had no choice but to hunt bears, since there were no foxes on the island that year. According to the journals, however, neither they nor the second group of winterers on Spitsbergen had any aversion to polar bear meat.

It is now well known that a possible consequence of the consumption of bear meat is hypervitaminosis A and trichinosis. It is probable that, without knowing all the details, the later wintering parties knew about the experiences of Barents. The food supply, however, determined whether or not the winterers ate bear meat.

All the winterers except for the English sailors gathered scurvy-grass (*Cochlearia officinalis*) as a cure against scurvy. They even indicated the distribution of this plant on their maps. However, only the first group of winterers in Smeerenburg found a way to preserve it properly by scattering it on the floor of one of the vacant houses and freezing it. Thus the winterers were able to offer scurvy-grass to the returning whalers the following year. The other winterers collected scurvy-grass and ate as much as possible before it withered.

## Physical and Mental Health

During all the winterings, the men suffered from frostbite. This mostly caused peeling of the skin, but sometimes worse

results, such as ulcers and whitlows (small abscesses under or near the nails), occurred. In some cases the patient had to have part of a finger cut off or, even worse, a finger or toe had to be amputated.

The Dutch winterers were troubled with carbon monoxide asphyxiation on Novaya Zemlya, Spitsbergen and Jan Mayen. Thanks to better stoves introduced at the last two places, the carbon monoxide asphyxiation only caused dizziness and fainting. Because of badly insulated chimneys, however, the draft was bad, and this caused much smoke inside the buildings. Because of the smoke the winterers got lung irritations that caused them to cough a great deal. The food made the men suffer from abdominal pains and constipation. On Novaya Zemlya the barber-surgeon made a kind of steam bath to lift sunken spirits and the accompanying purgative had a beneficial effect in easing constipation.

Although nothing is said about scurvy in the narrative of the Bell Sound winterers, it is probable that they too suffered from it. It depends very much on their condition on arrival whether the winterers succumbed to this disease. According to the sailors, it was caused by eating "old food" and the lack of "fresh food." Scurvy is usually fatal, although the journal of Segersz van der Brugge shows that by eating a steady diet of fox meat for almost two months the cook was cured of scurvy (l'Honoré Naber, 1930:142).

The men of the second wintering in Smeerenburg were not so lucky. They all died of scurvy. Their logbook does not leave us in any doubt about the scurvy, as all the symptoms were described; they could not move, were not able to masticate and had increasingly more pain in their legs, arms and body. In the end everybody was bedridden and unable to move and by the end of February all had died. In 1980 their remains were found in a grave on Amsterdam Island. The bones of five individuals had pathological signs of severe scurvy; of the other two nothing could be said, because nothing was left of them (Fig. 10) (Maat, 1984:302-303).

It is possible that eating bear meat, which was salted and not well cooked, was the real reason for the disaster of the Jan Mayen wintering. As mentioned above, it is well known that a possible consequence of the consumption of uncooked bear meat is trichinosis. This disease is caused by a larva that has an incubation period of six weeks. Because victims of this disease have great difficulty in moving after this period



FIG. 10. The grave of the seven winterers who died during their wintering in Smeerenburg on Amsterdam Island. (Photo Ben Bekooy.)

of incubation, their activities decrease markedly. From both Jan Mayen journals we may conclude that in the course of the winter the men's activities indeed decreased sharply. If someone did undertake something, it was with great difficulty. Obviously, environmental factors such as snow and storms played a role as well, but it is remarkable how often phrases such as "with great difficulty" occur in the last part of the wintering journals. The term is used for the first time about six weeks after 12 December, when they ate their first bear. This is long before 12 March, when scurvy is first mentioned (l'Honoré Naber, 1930:59; Brander, 1934:72, 1955:116).

Not much is said in the journals about the mental health of the winterers. The darkness and bitter cold of the polar winter confined the men to a very small space. According to the Bell Sound journal, this caused "thousands sorts of imaginations" (White, 1855:274). They often thought about their wives and families, which made them feel hopeless. "Otherwhiles againe, wee revive our selves with some comfort, that our friends might take, in hoping that it might please God to preserve us (even in this poore estate) untill the next year" (White, 1855:274).

From the journal of Segersz van der Brugge we know that one of the men thought he was possessed by the devil. He was very depressed and suffered from nightmares. Segersz van der Brugge gave him a prayer book and made him read

it, but during his praying his problems recurred (l'Honoré Naber, 1930:96). The journal does not tell us what happened to him during the rest of the winter. From another source we know, however, that the first seven Smeerenburg winterers were on several occasions troubled by superstition. According to Christian Bulle's logbook of 1667, the devil's fleet was several times seen in the bays of Spitsbergen, ready to collect them all. Also they laid the table for eight persons instead of seven, so that the devil could always sit down to the table and have dinner with them (Oesau, 1937:300). Segersz van der Brugge tells us in his journal that they were very frightened by unknown noises and light phenomena. The aurora, especially, frightened the men (l'Honoré Naber, 1930:112,113,122,124,132). Bulle connects this fear with the

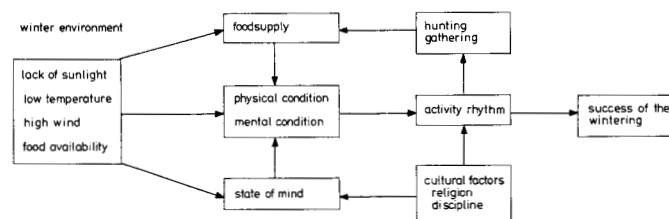


FIG. 12. Scheme of the interaction between the different winter aspects and the result of the wintering. (Drawing H.J. Waterbolk, photo CFD-RUG.)

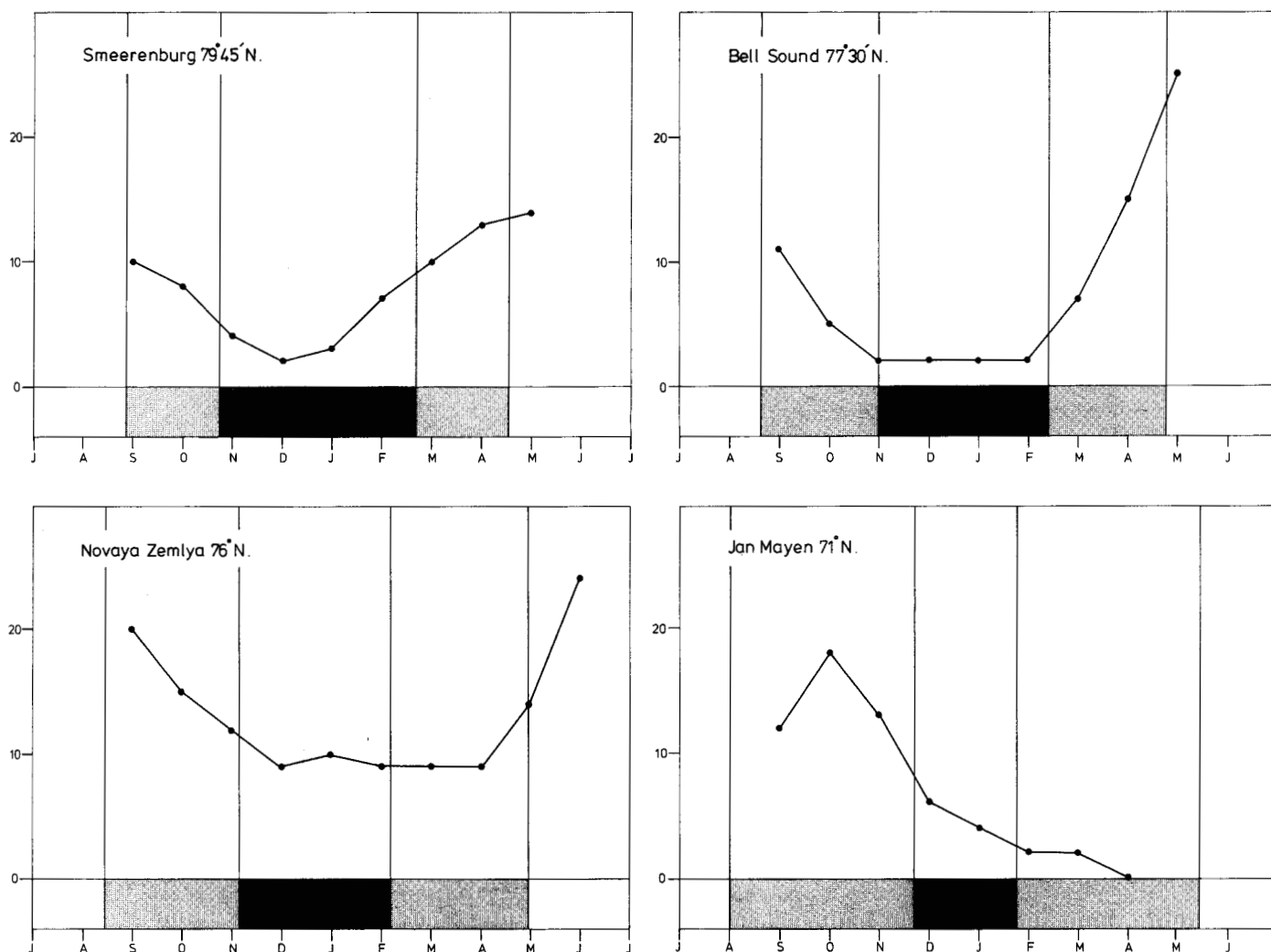


FIG. 11. Degree of activity during four winterings compared with the light conditions. (Drawing H.J. Waterbolk, photo CFD-RUG.)



devil when he says that the devil had been very noisy on Spitsbergen (Oesau, 1937:300). The fox also played a role in their fear, as it was believed to bring bad luck when it walked over the roof of the "Behouden Huis" on Novaya Zemlya (De Veer, 1917:92). According to Martens, some sailors believed that the barking of the fox was the laughing of the devil (Martens, 1675:72).

### CONCLUSIONS

Natural factors, such as lack of sunlight, low temperatures, high winds and food availability, influenced both the physical and mental conditions of the winterers. These conditions determined the degree of activity, which turned out to be very important for a successful wintering. A high degree of activity was not only important for gathering food, but also for avoiding boredom, irritation and superstition, which can subsequently lead to depression. If we compare the level of activity of four of the 16th- and 17th-century wintering attempts, it becomes clear that during all these winterings there was a high level of activity in the fall, at the beginning of the wintering, a low rhythm of activity in the polar night, and in three of the four cases an increasing rhythm of activity in the early spring (Fig. 11). The polar night was the most critical period, because it restricted the possibilities of activity. Therefore, the wintering group that succeeded in staying active in this period by hunting or trapping in the neighbourhood of the house, doing exercises inside the house and playing games outside the house as much as possible had the best chance of surviving. Morale, discipline and strong leadership were the most important requisites for reaching this goal (Fig. 12).

Another very important factor in surviving the polar winter turned out to be religion. Not only did their religious beliefs give the winterers hope and confidence for the future, which helped them to survive the depressive period, but morning and evening prayer also kept them to a common diurnal and nocturnal schedule. These prayers gave the winterers an opportunity to escape mentally from the isolation and difficulties they faced. In this context it is interesting to know that the English winterers at Bell Sound reacted to their mental difficulties by redoubling their prayers (White, 1855:275).

Moreover, the Sunday rest gave them a break from their daily routine and, together with the diurnal prayers, helped the winterers to keep the rhythm going. During the polar night the celebration of Christian feast-days with extra food and stimulants also played an important role. In this connection it is striking that in the journals of the two unsuccessful winterings nothing is said about the celebration of these days. Christmas is not even mentioned, though on that particular date other details are reported (l'Honoré Naber, 1930:48,164).

Besides the strategies for tackling the mental problems they encountered, some very important strategies were also created to deal with practical problems. Ingenuity and creativity turned out to be key factors in solving these problems. First, the winterers had to have good shelter against the extreme cold and the wind. The English sailors succeeded very well in building a house inside a house, which gave them sufficient shelter. The use of reindeer skins and the fact that the men slept two by two helped them to stay warm while asleep. In these respects the accidental English wintering was better

prepared than the Dutch involuntary and planned winterings. A more important problem was how to avoid scurvy. The English winterers were lucky to get enough reindeer meat, which prevented scurvy and kept the men in good shape, enabling them to hunt polar bears, arctic foxes and birds in the early spring. The gathering of scurvy-grass alone was not enough. It was necessary to find a way to preserve it, and it only helped in combination with fresh reindeer and fox meat.

It remains unclear to what extent the Spitsbergen winterers learned from previous 16th-century winterings. The introduction of the journal of the Bell Sound winterers proves that the writer knew of Barents's experiences, but whether he read about Barents before or after his wintering adventure on Spitsbergen is not known (White, 1855:254-256). We do not even know if the Dutch winterers had read the journal of the Novaya Zemlya wintering. But it is known from the logbook of Michiel Adriaensz de Ruyter, steersman of one of the whaling ships in the bays of Jan Mayen in 1633, that he had read the journal of the Novaya Zemlya wintering (l'Honoré Naber, 1930:19), although there is no indication that this information was common knowledge to wintering whalers in those days.

The journals of the winterings described here were printed and published (Fig. 13). These narratives, especially the Dutch ones, were very popular. On the one hand they confirmed existing ideas about the northern regions, but on the other hand they provided new information. From a *'histoire des mentalités'* point of view, the information in the English and



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FIG. 13. The front page of the printed journal of Jacob Segers van der Brugge. (Photo CFD-RUG.)

Dutch journals gives a clear picture of the conception the sailors had of the Arctic. This picture fits perfectly the medieval image of the Arctic. According to the theologians of this period, the Arctic was a world of giants, huge fishes and dragons, a region of mental destruction, the residence of the Anti-Christ. This image is found in Olaus Magnus's book, which was published in 1555 and remained the standard work on the North until the end of the 16th century (Vaughan, 1982:25). The devil coming to collect the men, the fear of noises, the aurora borealis and the belief that the barking fox was the laughing devil fit this image very well.

The new information in the wintering journals together with other contemporary literature gradually provided a more realistic image of the Arctic (Fig. 14). However, the new information was not always interpreted correctly. The fact that the first seven men left at Spitsbergen all survived while the men at Jan Mayen died underscored an old idea about the northern climate: namely, the idea that it worsened up to the Arctic Circle and improved again north of that. It was a long time before this idea was abandoned.

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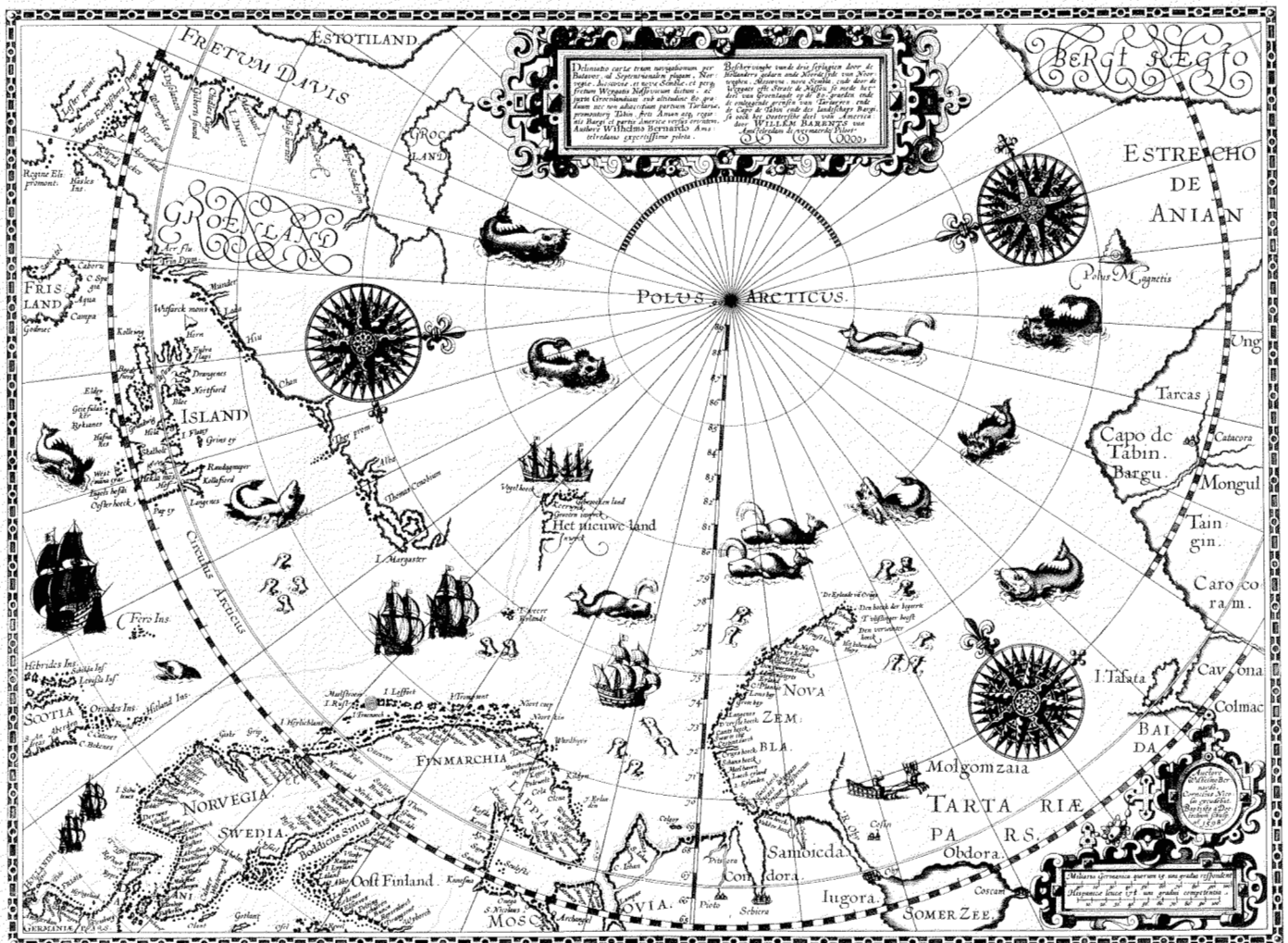


FIG. 14. The image of the Arctic as reflected in the polar map of Willem Barents published by Cornelis Claesz in 1598. (Photo University Library Amsterdam.)

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